various necessary directions. The museums and laboratories have been practically created within the present generation, but already many of them require considerable extension and better equipment. Important branches of study are rightly claiming recognition, but their demands cannot be met without heavy capital outlay. New sites have been secured, but the money to build on them is not forthcoming. The University library must be extended; the school of law is without a building; the lecture-rooms for the literary and philosophical subjects are wholly inadequate; there are neither central offices for University business, nor suitable rooms for University examinations; lastly, the laboratories for botany, zoology, and pathology must be rebuilt; the departments of physiology, physics, and engineering need speedy enlargement, and the school of medicine (including pharmacology) is practically beyond repair, and must be reconstructed on another site.

It is pointed out that while the total divisible income of the Colleges has fallen by 34 per cent. in the last fifteen years, the number of students has increased to 3000. Much personal devotion and sacrifice on the part of the teachers, much self-denial on the part of the Colleges which have not reduced their scholarships, and other encouragements for the poorer students, and much enthusiasm for the progress of science and learning on the part of all, must have gone to produce a result so creditable to the University. It appears to us that a fair case has been made out for its substantial re-endowment in respect of many of its departments; and, though no appeal for subscriptions is made, the facts related in the Chancellor's statement may well be pondered by those who are in a position to display a wise liberality in the cause of education, learning, and research.

NOTES

At a meeting held on April 13, the Academy of Natural Sciences of Philadelphia conferred the Hayden Memorial Award for 1897, consisting of a bronze medal and the interest of the special endowment fund, on Prof. A. Karpinski, the Chief of the Geological Survey of Russia, in recognition of the value of his contributions to geological and palæontological science.

The Budget Commission of the French Government has decided that the sum of four thousand pounds be voted for the Pasteur Institute at Rhia-Trang, to encourage Dr. Yersin's researches on the plague serum. The Chamber of Deputies is asked to adopt this decision.

The *British Medical Journal* says there is a Bill before the New York State Legislature which provides for the establishment of a laboratory for the preparation of evidence for use in future trials for murder conducted by the State. In a recent case 1450*l.* was paid to medical witnesses for giving expert evidence. The object of the new Bill is to save this expense.

Sir Edward Newton, K.C.M.G., died at Lowestoft on April 25, in the sixty-fifth year of his age. The youngest son of the late Wm. Newton, of Elveden, in Suffolk, he proceeded to Magdalene College, Cambridge, where he took the usual degrees. Appointed, in 1859, Assistant Colonial Secretary of Mauritius, he successively became Auditor General and Colonial Secretary of that island, relinquishing the last post in 1877, on being appointed Colonial Secretary and Lieutenant Governor of Jamaica, whence he retired in 1883, through ill-health. He was a member of the mission sent by the Government of Mauritius to congratulate the late King of Madagascar on his accession to the throne; and, being an ardent ornithologist, availed himself of the occasion by materially increasing (as he did during a subsequent visit made with that express purpose) the knowledge of the very peculiar fauna of that country, which he was almost the first English naturalist to investigate on the spot. In like manner he largely increased our knowledge of the zoology of the Mascarene Islands generally, and it is mainly due to his exertions that nearly complete skeletons of the marvellous "Solitaire" of Rodriguez were recovered from the caves of that island, as described in the *Philosophical Transactions* of the Royal Society. Sir Edward was one of the founders of the British Ornithologists' Union, a Fellow of the Linnean Society, and a Corresponding Member of the Zoological Society of London.

We regret to see the announcements of the death of Dr. E. S. Bastin, professor of botany and materia medica at the Philadelphia College of Pharmacy, and of Mr. Louis P. Casella, the well-known scientific instrument maker.

The southern portion of Bronx Park, which the Commissioners of the Sinking Fund of the City of New York have just allotted for the use of the New York Zoological Society, embraces an area of about 260 acres. The city authorities will annually provide the funds for the maintenance and care of the buildings, animals and collections in the Zoological Garden which will be established in the Park; but the grant for the first year is not to exceed sixty thousand dollars. The erection and original equipment of the buildings, and the animals to stock them, have to be paid for by the Zoological Society, which has to raise one hundred thousand dollars by subscription before this time next year, and the further sum of one hundred and fifty thousand dollars within three years of the commencement of the work of converting Bronx Park into a Zoological Garden. Strong efforts are therefore being made to secure to the Society the sympathy and support of a large number of members. An attractive report on the plans and purposes of the Society has been printed and circulated, and in it Mr. William T. Hornaday, the Director of the proposed Garden, describes the zoological gardens of Europe, and dwells upon the advantages offered by Bronx Park. He holds that none of the Gardens he visited "occupies ground which can for one moment be compared, either in physical character or in extent, with the matchless site that has been chosen by this Society for the Zoological Park of America." One of the conditions of the grant of South Bronx Park to the Society is that the Zoological Garden and its collections shall be open free to the public for not less than seven hours a day, or at least five days a week.

The Belgian Royal Academy announces prizes, mostly of the value of 600 francs, to be awarded in 1898 for essays on certain questions connected with the following subjects: In mathematical and physical science—on the critical phenomena, on theories of the constitution of solutions, on the correspondences (*Verwandtschaften*) between two spaces, and on the influence of the radical NO_2 in certain compounds. In biological science—on the macro- and micro-chemistry of digestion in carnivorous plants, on the physiology of some invertebrate animal, and on the organisation and development of the *Platoda*. A further prize of 1000 francs is offered, in memory of Jean-Servais Stas, for the best determination of the atomic weight of some element for which this constant is at present uncertain.

In the last number of its *Proceedings*, the London Mathematical Society publishes the outlines of seven lectures on the Partitions of Numbers, which were delivered by the late Prof. Sylvester at King's College, London, during the year 1859. The outline of each lecture was printed shortly before its delivery, and copies handed to those in attendance. The Professor's attention was shortly afterwards diverted to another branch of mathematics, with the result that his researches on compound partitions have hitherto remained unpublished; but shortly before his death, Prof. Sylvester yielded to the suggestion of the Council of the London Mathematical Society, so far as to assent to the publication of these outlines with all their imperfections on their heads.

One of the most important problems now attracting the attention of seismologists is the choice of a system of stations in which to carry out the seismic survey of the world. In the plans so far proposed, advantage would, for obvious reasons, be taken of the existence of astronomical observatories, care being at the same time exercised to obtain a nearly uniform distribution of stations over the earth's surface. Prof. G. Grablovitz has recently, however, made the important suggestion that these stations should rather follow the distribution of volcanoes and the great lines of fracture of the globe. He points out that the majority of active volcanoes are situated close to three great circles, and he proposes that seismic stations should be founded near the six points of intersection of these circles, and near twelve other points symmetrically placed on the three circles. There are several obvious difficulties in the way of such an arrangement; but it is, nevertheless, one that deserves a very careful consideration.

In the *Bulletin de l'Académie Royale de Belgique*, M. P. de Heen attacks the ordinary accepted theory of the critical point, according to which the horizontal portions of the isothermals of a substance gradually diminish to a vanishing point, and the extremities of these portions lie on a continuous curve whose tangent is horizontal at that point. M. de Heen maintains that the rectilinear portion of the isothermals does not vanish at the critical point, but that just after passing that point its direction gradually becomes inclined to the horizontal axis.

In the *Monthly Weather Review* for January, of the U.S. Weather Bureau, Mr. A. L. Rotch gives an account of the cloud observations being made at the Blue Hill Observatory, Massachusetts, since May 1, 1896, in accordance with the request of the International Meteorological Committee. There are three theodolite stations in the same straight line, at which simultaneous observations of height and velocity are made twice daily, when conditions permit. Points on the clouds are selected by telephonic communication, and, when practicable, from three to five observations are taken on the same point, at intervals of a minute, and are reduced by simple trigonometrical formulæ. The theodolite measurements are supplemented by other methods, devised by Mr. Clayton, to determine the heights of the lower clouds, including the use of kites. It is found necessary to employ these additional methods, because the low clouds are so indefinite in form, or cover the sky with such a uniform veil, that it is impossible to measure them with theodolites or photogrammeters. We may confidently look for valuable results from these persistent and careful observations.

The *Meteorologische Zeitschrift* for March contains an interesting communication on the oldest meteorographs, for which we are indebted to the indefatigable bibliographical researches of Dr. Hellmann. It was known from Birch's "History of the Royal Society," that Sir Christopher Wren had constructed a meteorograph about the year 1660; but a complete description of the apparatus was wanting, as only a portion of it was shown in the plate. But Dr. Hellmann has discovered both a description and a sketch of the instrument in the *Journal des voyages de M. de Monconys* (Lyon, 1665-1666). As this work is scarce, although a later edition of it is in the Library of the Royal Society (London), Dr. Hellmann quotes the passages referring to the meteorograph, and reproduces the sketch. The rain-gauge, forming part of the instrument, was the first of its kind. During a visit to London in 1663, Monconys obtained particulars from Wren of a hygrometer which he had also invented, and a description and sketch of this are given in the *Zeitschrift.* Wren, therefore, constructed the second condensation hygrometer; but this does not appear to be generally known, as no mention is made of it in Mr. Symons's "History of Hygrometers" (*Quart. Journ. Meteor. Soc.*, vol. vii.). The first condensation hygrometer was invented by Prince Ferdinand II of Tuscany, about ten years earlier.

The effect of hardness on the electrical and magnetic constants of steel, with particular reference to the tempering of the magnetic parts of instruments, is the subject of a short paper, by Dr. Carl Barus, in the March number of *Terrestrial Magnetism.* The following rules, given by Dr. Barus, for the practical treatment of magnets, where great secular permanence of magnetisation is the principal desideratum, should prove of great service in physical laboratories and to scientific instrument makers. (1) Rods tempered glass-hard are not to be used as essential parts of magnetic instruments. (2) Having tempered a given steel rod in such a way as insures uniformity of glass-hardness throughout its length, expose it for a long time (say 20-30 hours; in case of massive magnets even longer intervals of exposure are preferable) to the annealing effect of steam (100°). The operation may be interrupted as often as desirable. The magnet will then exhibit the maximum of permanent hardness for 100°. (3) Magnetise the rod—whether originally a magnet or not is quite immaterial—to saturation, and then expose it again for about five hours (in case of massive magnets even larger intervals of exposure are preferable) to the annealing effect of steam (100°). The operation may be interrupted as often as desirable. The magnet will then exhibit both the maximum of permanent magnetisation as well as the maximum of permanent hardness corresponding to 100°. Its degree of magnetic permanence against effects of temperature (less than 100°), time, and percussion is probably the highest conveniently attainable.

Working in the physical laboratory of the Massachusetts Institute of Technology, Mr. R. W. Wood has succeeded in producing diffraction phenomena with Röntgen rays. The source of the rays was an arc-like discharge between two very small beads of platinum in a high vacuum. The discharge bulb was only about an inch in diameter, while the radiation (which came from an area about the size of a pin-head) was strong enough to show the bones in the fore-arm. The "arc" appeared to be a new form of kathode discharge, and could only be produced under peculiar conditions. Mr. Wood used a tube with a platinum slit 0·1 mm. wide, mounted within the bulb at a distance of 2 mm. from the radiating bead. The second slit of variable width was placed at a distance of 10 cm. from the first, and the photographic plate at distances varying from 10 to 30 cm. from this. The images of the slit on the plate showed a distinct dark line on each edge, which could only be explained on the supposition that interference occurred. The plate was at too great a distance from the slit for such an effect to be produced by reflection of the rays from the edges. Images of fine wires showed similar phenomena.

The study of the origin and significance of ornamental devices and patterns is engaging fresh workers. In a recent number of *Globus* (Band lxxi. p. 197), H. Strebel discusses certain ornamental motives of ancient Mexico. The series of designs with which he is here concerned are attributes of the Wind-god, Quetzalcoatl. The similarity of these devices from the Pueblo Indians, right down to Peru, indicate that there was an original community of culture.

The directors of the Biltmore Herbarium have prepared a catalogue of the duplicate specimens in the collection, with the view of effecting exchanges. The list represents mainly plants indigenous to Western North Carolina, which have been carefully dried and, in many instances, specially prepared for distribution. The catalogue can be obtained from the curator, Mr. C. D. Beadle, Biltmore, North Carolina, U.S.A.

In June 1895, Messrs. P. A. Rydberg and C. L. Shear were commissioned by the Secretary of Agriculture of the United States to pay a three months' visit to certain points in the States of Nebraska, Idaho, Montana, Utah, and Colorado, for the purpose of collecting roots and seeds of grasses and other forage plants, and of obtaining information from farmers and others as to their economic value. The Report of this Commission forms *Bulletin* No. 5 of the U.S. Department of Agriculture, Division of Agrostology. A large number of grasses are described and figured, and notes are appended with regard to their value to agriculturists.

The St. Petersburg Society of Naturalists, section of Botany, proposes to issue a full herbarium of the flora of European Russia, similar to Fries's "Herbarium normale" and to Kerner's "Flora exsiccata Austro-hungarica." It will be issued in parts of fifty species each, under the editorship of S. I. Korzinski, and every person who will send to the editor (St. Petersburg University) two species, represented by fifty specimens each, will be entitled to receive one part of the herbarium. A preliminary communication with the editor would save the trouble of a double collection of the same species, in which case the person who has sent its plants first will have the priority. Each part will contain the species fastened to paper, or not if preferred, and each species will have a printed note giving the name of the plant, the spot wherefrom it comes, and various literary and critical observations. The copies which may remain over, after the contributors have been supplied with their parts, will be sold.

Delicate filaments of living matter flow out from the protoplasm of many one-celled animals, and exhibit remarkable movements. Similar thread-forming phenomena are said, by Gwendolen Foulke Andrews, to appear when the protoplasm of developing starfish and sea-urchin eggs are examined under very high powers; they are termed by the author the *spinning* activities of the living substance (*Journal of Morphology*, February 1897, vol. xii.). It is claimed that the filaments are projected from normal Echinoderm eggs; and that they are concerned in the formation of the egg membrane. The facts appear to point to a physiological drawing together of the cells by the filaments, rather than to any physical and chemical "cyto-tropismus." Also, a physiological, rather than a physical, reaction to mechanical stimulus of pressure or shaking is indicated; in fact, the cause of the spinning activities is held to be physiological rather than physico-chemical. For the living substance, cell-walls apparently do not a prison make, for we read: "Whatever may be the significance of the cell-wall in the development of these eggs, it surely cannot be thought a separator, in either a physical or physiological sense, of the cell contents from other portions of the common mass." Or, as put in other words, "the peripheral substance of eggs and cells is freely protoplastic, despite its appearance under less magnification of being a smooth and stable pellicle."

The following lectures will be given during May at the Royal Victoria Hall, at 8.30:—May 4, "Mountains of Skye," by Dr. T. K. Rose; May 11, "More about Röntgen and other Rays," by Prof. A. W. Porter; May 18, "Travel and Adventure in South Africa," by Mr. F. C. Selous; May 25, "Growth of the Colonies in the Queen's Reign," by Mr. O'Donnell.

We have received vol. xl. part v. and vol. xxx. part iv. of the Annals of the Astronomical Observatory of Harvard College. The first of these gives the observations made at the Blue Hill Meteorological Observatory under the direction of Mr. A. Lawrence Rotch, and contains an appendix, including summaries of observations for the lustrum and decade, a discussion of them, and a bibliography. The second of these volumes deals with a discussion of the cloud observations by Mr. H. Helm Clayton. This is described somewhat in detail, and several interesting plates showing, for instance, the average cloudiness during cyclones, anti-cyclones, their movements, and numerous annual and diurnal curves, illustrating average cloudiness at Blue Hill.

Four common species of the family Dermestidæ have become vegetarians; and their conversion forms the subject of a paper in *Bulletin* No. 8 (New Series), of the U.S. Department of Agriculture (Division of Entomology). Cyclopædias and text-books inform us that the members of this well-known family feed upon dried animal substances. The depredations of certain species on leather, hides, and dried meats; of others on carpets, furs, and woollen goods; and of still others on dried insects, and other "objects of natural history" are, unfortunately, too well known to require further comment. Within recent years, however, several household dermestids have been suspected of living in the larval condition upon vegetable substances, and the charge of having vegetarian proclivities has now been brought home to four species, viz. *Attagenus piceus*, or black carpet beetle; *Trogoderma tarsale*, a bad cabinet pest; *Trogoderma sternale*, and *Anthrenus verbasci*. The first-named is found guilty of feeding upon flour and meal; the second revels in fiery-red pepper; and the third species appears to be able to thrive on such laxative substances as castor-beans and flax-seed. The change from a natural animal-feeding habit to a vegetable one is attributed to altered environment.

We have just received the Report of the U.S. National Museum, under the direction of the Smithsonian Institution, for the year 1894. About two hundred pages of this report are devoted to reviewing the work accomplished in the various scientific departments of the Museum, and general administrative matters; the remaining five hundred pages are taken up with most valuable papers describing and illustrating collections in the Museum. These papers have already been referred to (p. 469), and we need only now give expression to the gratitude which all men of science feel towards the Smithsonian Institution for the many ways in which it extends knowledge among men.—Another recent publication by the Smithsonian Institution is "A Recalculation of Atomic Weights," by Prof. Frank W. Clark. This fifth publication in a series on "The Constants of Nature" comprises a full discussion and recalculation of atomic weights from all the existing data, and the assignment of the most probable value to each of the elements. The first edition was published in 1882. The enormous mass of new material which has since become available has been assimilated and combined by Prof. Clark with the old data in the present edition of his most handy work.

Dr. S. Schönland's report on the Albany Museum, Grahamstown, during the year 1896, shows satisfactory progress. Large additions have been made to the publicly exhibited collections, and the collections formed for purely scientific purposes have grown even more rapidly. A sum of three thousand pounds was voted by the Cape Parliament last year towards the cost of a new building to accommodate the increasing number of specimens. Plans have been prepared for the new museum, and it is hoped that Parliament will make a further grant to enable them to be carried out. The alarming spread of insect pests in the Eastern Province occupied the attention of the Committee of the museum for some time, and the conclusion was arrived at that it was largely due to the wholesale destruction of insectivorous birds. Steps have therefore been taken to protect useful birds and their eggs. Dr. Schönland has established a small private botanic garden for South African plants. He remarks that he was driven to this step, because there is, unfortunately, no public garden in Cape Colony for the study of the South African flora. The relics of pre-historic South African races were also studied during the year, some interesting finds being obtained from three caves at King's Quarry, Grahamstown. A number of peculiar drawings on rocks in Bechuanaland were examined by Dr. Schönland. Although there was no decisive evidence to show that they were the work of Bushmen, the facts obtained certainly point to that conclusion.

Among noteworthy articles and publications which have come under our notice during the past few days are the following:—"Storms and Weather Forecasts," by Prof. Willis L. Moore, in the *National Geographic Magazine* (March). Twenty-six full-page plates, illustrating the weather characteristics of the United States, accompany this article.—"Neural Terms, International and National," by Prof. Burt G. Wilder, reprinted from the *Journal of Comparative Neurology*, vi. (December 1896). A critical treatise on the principles and practice of anatomical nomenclature, with special reference to the brain.—"Zusammenstellung der Ergebnisse neuerer Arbeiten über atmosphärische Electricität," by Profs. J. Elster and H. Geitel (Jahresbericht des Herzogl. Gymnasiums zu Wolfenbüttel, 1897). Some years ago (1891), Profs. Elster and Geitel brought together, in the yearly report of the Wolfenbüttel Gymnasium, the investigations which had been made on atmospheric electricity. They have now collated the large amount of work done by others and themselves during the past six years. Their review is thus a valuable summary of the progress made in an important branch of scientific inquiry.—The *Procès-verbaux* of the International Committee on Weights and Measures, for the year 1895, and the *Comptes rendus* of the meetings of the second conference on weights and measures, held in Paris in 1895.—On the Artificial Production of certain Organic Forms, and the Manner in which they are Produced," by the late Mr. George Rainey (St. Thomas's Hospital Reports, vol. xxiv.). This paper is reprinted from the *Medical Times and Gazette* of 1868, and all practical workers in experimental physiology will be glad to have their attention drawn to it. Mr. W. W. Wagstaffe contributes a brief introduction to the reprint.—"A Summer Voyage to the Arctic," by G. R. Putnam (*National Geographic Magazine*, April). An account is given of a voyage to Umanak fiord, in the northern part of Danish Greenland, and several hundred miles within the Arctic circle. The magnetic observations made during this expedition are described by Prof. G. R. Putnam in the March number of *Terrestrial Magnetism*.—"Contributions towards the Bibliography of Photography in Colours," by Thomas Bolas (*Journal* of the Society of Arts, April 23). A valuable descriptive list of what has been published on colour photography since 1810.—A full and very appreciative obituary notice of the late Prof. Sylvester is contributed to *Science* of April 16, by Prof. G. B. Halsted, who was his first pupil in the Johns Hopkins University.—In a Catalogue of Mathematical Works offered for sale by Messrs. Dulau and Co., mathematicians will find many rare and valuable papers. The catalogue runs into 178 pages, and the names of authors are arranged in alphabetical order.

It is well known that when carbon is used as anode in the electrolysis of electrolytes from which oxygen is evolved among the products of decomposition, the carbon is attacked more or less rapidly. This is due partly to chemical action, partly to mechanical disaggregation. Mr. Alfred Coehn contributes an interesting note on this important subject to the *Zeitschrift für Elektrochemie* for April 5. The phenomena observed when dilute sulphuric acid is electrolysed with platinum kathodes, and carefully purified arc-lamp carbons as anodes, depend on the concentration of the acid. When an acid containing 500 volumes of water to one volume of concentrated sulphuric acid is used, the liquid gradually becomes dark brown; with equal volumes of acid and water, it remains colourless; with intermediate concentrations the depth of colour is intermediate At higher temperatures the mechanical destruction of the carbon diminishes, and even the stronger acids become brown. The author has attempted to determine the electro-chemical equivalent of carbon, employing acid containing equal volumes of strong sulphuric acid and water, at a temperature of 100° C. Under these circumstances the mechanical destruction of the carbon appears to be small compared with the chemical attack. While 4·0085 grams of copper were deposited in a copper voltameter, the carbon anodes lost 0·4476 and 0·4537 grams respectively, from which the value of the equivalent is 3·5. In a second series of experiments, in which the concentration of the acid was varied considerably, and the fragments of carbon mechanically lost were collected, weighed, and deducted from the total loss of weight of the anodes, values were observed varying from 2·7 to 3. The author promises further details of the experiments in a future communicaton.

The additions to the Zoological Society's Gardens during the past week include a White-fronted Capuchin (*Cebus albifrons*) from Venezuela, presented by Sir William Hoste, Bart.; two Pin-tailed Sand Grouse (*Pterocles alchata*) from India, presented by Mr. W. H. St. Quintin; a Black-headed Gull (*Larus ridibundus*), British; two Rufous-necked Weaver Birds (*Hyphantornis textor*) from South Africa, presented by Mr. W. H. Dobie; a Cactus Conure (*Conurus cactorum*) from Brazil, presented by Mrs. A. G. Scorer; a White-crested Touracou (*Turacus corythaix*) from South Africa, deposited; a Crowned Lemur (*Lemur coronatus*) from Madagascar, a —— Spider Monkey (*Ateles variegatus?*) from South America, three Double-banded Sand Grouse (*Pterocles bicinctus*) from Senegal, purchased.

OUR ASTRONOMICAL COLUMN.

Peculiar Stellar Spectra.—Harvard College Circular (No. 17) continues the list of stars the spectra of which have been designated as "peculiar."

The table contains no less than nineteen stars, but we will confine ourselves in the summary to those of smaller southern declinations.

Designation.	Approx. R A. 1900.	Approx. Decl. 1900.	Mag.	Description.
	h. m.	° ′		
A.G.C. 9313	7 14·5	−24 47	4·6	Peculiar. 30 Can. Maj. Resembles ζ Puppis.
A.G.C. 10182	7 43·9	−25 42	5·3	Hβ bright. o Puppis.
	13 31·1	−55 58		Peculiar. Variable.
A.G.C. 22640	16 39·2	−46 54	7·4	Bright band, wave-length about 4700.
	20 8·5	−44 43		Peculiar. Variable.
A.G.C. 29191	21 11·5	−39 15	7·3	Peculiar.
A.G.C. 31272	22 55·0	−23 4	8	Peculiar.

In the notes it is mentioned that the third star in the above list "may resemble" that of ζ Puppis, since it contains two bright lines which may coincide with the lines having wave-lengths 4633 and 4688. ζ Puppis, 29 Canis Majoris, 30 Canis Majoris, and this star may form a subdivision of Type V. All these stars are near the central line of the Milky Way.

The fifth star was noted by Dr. Stewart as "bright-line star (faint)" on a Bruce photograph. An examination by Mrs. Fleming has indicated that the star is variable and the spectrum peculiar.